

## ABSTRACT

This invention is directed to an optically-based method and system for analyte detection using solid phase immobilization, specific analyte labels adapted for signal generation and corresponding processes for the utilization thereof. The enumeration detection method disclosed herein narrows the area for signal observation, thus, improving detectable signal to background ratio. The system is comprised of a platform/support for immobilizing a sample stage having a labeled sample (analyte complex) bound thereto, a radiation source, an optical apparatus for generating and directing radiation at said sample and a control that obtains data and then conducts analyses using digital image data. Upon engagement of the system, the sample generates a signal capable of differentiation from background signal, both of which are collected and imaged with a signal detector that generated a sample image to a data processing apparatus. This apparatus receives signal measurements and, in turn, enumerates individual binding events. Generated signal may be increased via selected mass enhancement. The invention, enumeration assay methodology detecting individual binding events, may be used, for example, in analyses to detect analyte or confirm results in both research, commercial and point of care applications.

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